NOVEMBER 2009

STANDARD DRAINAGE CONTROL PLAN - Single Family Project Type

Applicant Plan Sheet

SECTION I: GREEN STORMWATER INFRASTRUCTURE (GSI)

The City of Seattle's Stormwater Code requires that single-family residential projects implement Green Stormwater Infrastructure (GSI) to the maximum extent feasible. GSI is a stormwater Best Management Practice (BMP) that utilizes infiltration, dispersion, evaporation, transpiration, and/or detention. The intent of GSI is to help mitigate the impacts of development. GSI provides a function in addition to stormwater management such as water reuse, open space or providing green space and/or wildlife habitat in the City. The goal is to encourage a smaller building footprint and to effectively manage stormwater runoff as close to the point of origin as possible. See CAM 530 for an in-depth explanation of GSI.

To meet submittal requirement for a single-family residential projects, fill out the Pre-Sized Worksheet below. Refer to Director's Rule 19-2009 – *Requirements for Green Stormwater Infrastructure* for further information, Credits and Sizing Factors.

SECTION II: PRE-SIZED WORKSHEET FOR EVALUATING GSI

A. New Plus Replaced Impervious [1] Area → _____ sf

B. Single-Family Residential Project Credit → - 1,500 sf

C. Impervious Area Requiring Mitigation → _____ sf
(Subtract Item B from Item A)

D. GSI Impervious Surface Reduction Methods	Facility Size			Credit (Table A.2)		Area Mitigated
1. Retained Trees						
Existing Evergreen	Canopy Area	____	sf x	____	=	____ sf
Existing Deciduous	Canopy Area	____	sf x	____	=	____ sf
2. New Trees						
New Evergreen	# Trees	____	Trees x	____	=	____ sf
New Deciduous	# Trees	____	Trees x	____	=	____ sf
3. Alternative Pavement Surfaces						
Permeable Pavement Surface with slope ≤2%	Pavement Area	____	sf x	____	=	____ sf
Permeable Pavement Surface with slope 2-5%	Pavement Area	____	sf x	____	=	____ sf
4. Alternative Roof Surfaces						
Green Roof (Single-Course / 4" Growth Medium	Roof Area	____	sf x	____	=	____ sf
Green Roof (Multi-Course / 4" Growth Medium	Roof Area	____	sf x	____	=	____ sf
Green Roof (Multi-Course / 8" Growth Medium	Roof Area	____	sf x	____	=	____ sf

E. Area Mitigated by GSI Facilities (Sum Items 1 – 4) → _____ sf

F. GSI Facilities	Facility Size			Sizing Factor (Table A.3 & A.4)		Area Mitigated	Contributing Area Directed to Facility (as shown on plan)
Infiltrating Facilities							
5. Bioretention Cell (without Underdrain)							
Ponding Depth ____ in	Bottom Area	____	sf ÷	____	=	____ sf	____ sf
Design Infiltration Rate ____ in/hr							
6. Permeable Pavement Facility (with storage / overflow)							
Storage Reservoir Depth ____ in	Pavement Area	____	sf ÷	____	=	____ sf	____ sf
Design Infiltration Rate ____ in/hr							
Non infiltrating Facilities							
7. Bioretention Planter (with Underdrain)							
Ponding Depth ____ in	Bottom Area	____	sf ÷	____	=	____ sf	____ sf
8. Detention Cistern							
Contributing Area ____ sf	Min Cistern Area	____	sf ÷	____	=	____ sf	____ sf
3' Head Min	Min Live Cistern Volume	____	gal				

G. Area Mitigated by GSI Facilities (Sum Items 5 -8) → _____ sf

H. Total Area Mitigated (Sum Items E & F) → _____ sf

I. Percent Total Required Impervious Surface Mitigated → _____ %
(Divide Item H by Item C)

GSI – Green Stormwater Infrastructure

1. Approved electronic worksheet available on DPD website.
2. Per SMC 22.801.100, impervious surfaces include, but are not limited to, roof tops, walkways, patios, driveways, formal planters, parking lots or storage areas, concrete or asphalt paving, permeable paving, gravel surfaces subjected to vehicular traffic, compact gravel, packed earthen materials, and oiled macadam or other surfaces which similarly impede the natural infiltration of stormwater.

SECTION III: GSI PLANTINGS

Complete the following calculator to determine the minimum number of plantings required for:

	Facility Size Area			Multi-plication Factor		Total Number of Plants (round up)*
Bioretention Cell(s)						
Small Trees (if used)	Bottom & Sides	____	sf x	0.012	=	____ ea
Shrubs	Bottom & Sides	____	sf x	0.028	=	____ ea
Groundcover/Herbaceous Plants	Bottom & Sides	____	sf x	0.084	=	____ ea
Bioretention Planter(s)						
Small Trees (if used)	Bottom	____	sf x	0.012	=	____ ea
Shrubs	Bottom	____	sf x	0.028	=	____ ea
Groundcover/Herbaceous Plants	Bottom	____	sf x	0.084	=	____ ea
Green Roofs						
Groundcover/Succulent Plants	Footprint	____	sf x	0.088	=	____ sf

Planting General Notes:

- For a list of approved plants, see the Seattle Green Factor plant list: http://www.seattle.gov/dpd/Permits/GreenFactor/GreenFactorTools/default.asp
- Plans shall specify that vegetation coverage of selected plants will achieve 90-percent coverage within 2 years or additional plantings shall be provided until this coverage requirement is met.
- Plants shall be sited according to sun, soil, wind and moisture requirements
- At a minimum, provisions must be made for supplemental irrigation during the first two growing seasons following installation.

Bioretention Cells and Planters Notes:

- Provide a minimum of three different species of shrubs and herbaceous plants.

Green Roofs Notes:

- Appropriate plants include succulents, grasses, herbs, and wildflowers that are adapted to harsh conditions. Plants can be installed as pre-grown mats, individual plugs, cuttings, or spread as seeds.
- A Landscape Management Plan shall be developed and implemented.

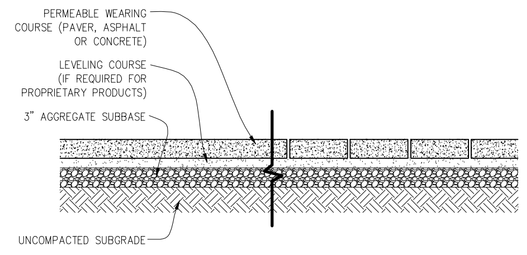
SECTION IV: GSI AFFIRMATION

Affirmative statement for Green Stormwater Infrastructure to the Maximum Extent Feasible:
I,_____, certify that Green Stormwater Infrastructure has been implemented to the Maximum Extent Feasible for this project.

Owner/Owner's Rep Signature:_____ Date: _____

SECTION V: GSI STANDARD DETAILS

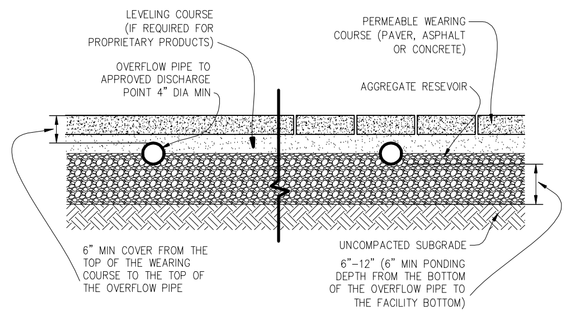
PERMEABLE PAVEMENT SURFACE



NOTES:
1. PERMEABLE PAVEMENT SURFACE AREA DIMENSIONS AND PAVEMENT SLOPE MUST BE SHOWN ON DRAINAGE CONTROL PLAN.
2. AGGREGATE SUBBASE SHALL BE TYPE 22-5/8"-3/4" CLEAR, CRUSHED GRAVEL.
3. PERMEABLE PAVEMENT SURFACE MUST BE LESS THAN 5% SLOPE TO RECEIVE FLOW CONTROL CREDIT.

SYMBOL: (PPS)

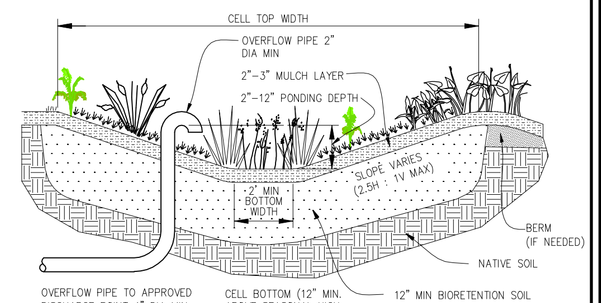
PERMEABLE PAVEMENT FACILITY



NOTES:
1. PERMEABLE PAVEMENT SURFACE FACILITY DIMENSIONS AND PAVEMENT SLOPE MUST BE SHOWN ON DRAINAGE CONTROL PLAN.
2. AGGREGATE RESERVOIR SHALL BE TYPE 22-5/8"-3/4" CLEAR, CRUSHED GRAVEL.
3. PERMEABLE PAVEMENT FACILITY MUST BE LESS THAN 5% SLOPE TO RECEIVE FLOW CONTROL CREDIT.

SYMBOL: (PPF)

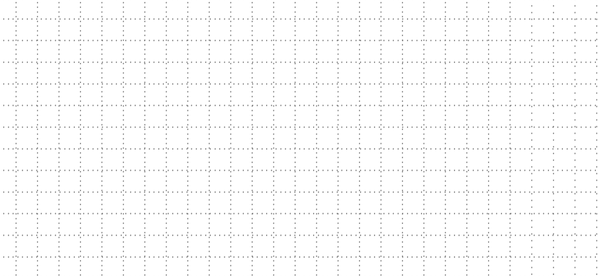
BIORETENTION CELL
WITH SLOPED SIDES



NOTES:
1. BOTTOM AND TOP CELL DIMENSIONS MUST BE SHOWN ON DRAINAGE CONTROL PLAN.
2. PONDING DEPTH SHALL BE NOTED ON PRE-SIZED CALCULATOR.
3. BOTTOM CELL WIDTH SHALL BE A MINIMUM WIDTH OF 2 FEET.

SYMBOL: (BC)

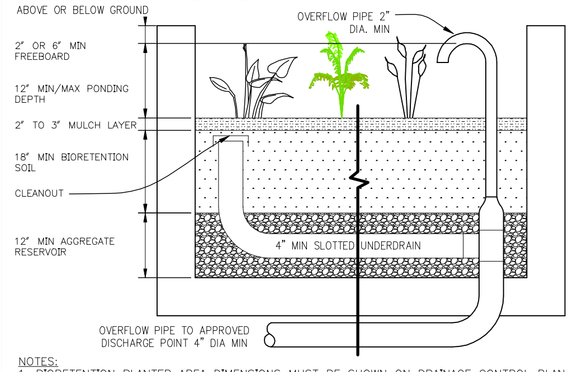
BIORETENTION CELL
WITH 2" MAX RETAINING WALLS



NOTES:
1. BOTTOM AND TOP CELL DIMENSIONS MUST BE SHOWN ON DRAINAGE CONTROL PLAN.
2. PONDING DEPTH SHALL BE NOTED ON PRE-SIZED CALCULATOR.
3. BOTTOM CELL WIDTH SHALL BE A MINIMUM WIDTH OF 2 FEET.

SYMBOL: (BC)

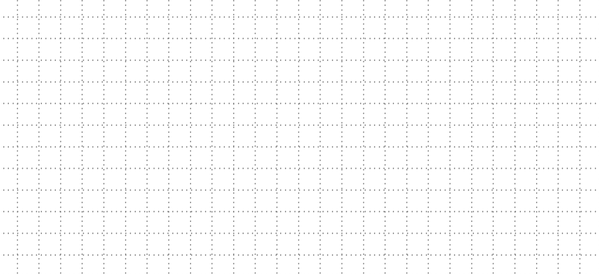
BIORETENTION PLANTER
ABOVE OR BELOW GROUND



NOTES:
1. BIORETENTION PLANTER AREA DIMENSIONS MUST BE SHOWN ON DRAINAGE CONTROL PLAN.
2. AGGREGATE RESERVOIR SHALL BE TYPE 22-5/8" - 3/4" CLEAR CRUSHED GRAVEL.
3. PLANTER SHALL BE A MINIMUM WIDTH OF 2 FEET.
4. SLOTTED DRAIN PIPE SHALL RUN THE LENGTH OF THE PLANTER.
5. MINIMUM FREEBOARD SHALL BE 2 INCHES FOR DRAINAGE AREAS LESS THAN 1,000 SF AND 6 INCHES FOR CONTRIBUTING DRAINAGE AREAS GREATER THAN 1,000 SF. FREEBOARD SHALL BE NOTED ON PRE-SIZED CALCULATOR.

SYMBOL: (BP)

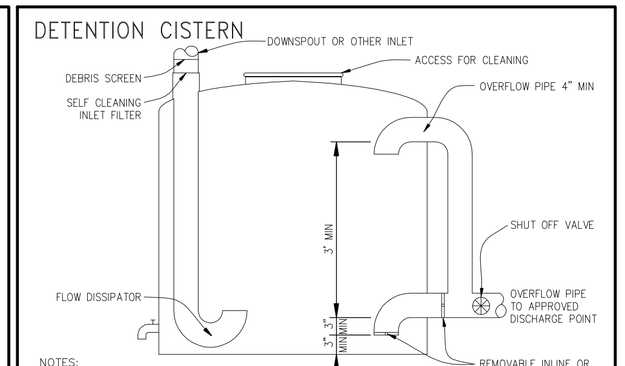
GREEN ROOF



- SINGLE COURSE: 4" GROWTH MEDIUM
- MULTI COURSE: 4" GROWTH MEDIUM
- MULTI COURSE: 8" GROWTH MEDIUM

SYMBOL: (GR)

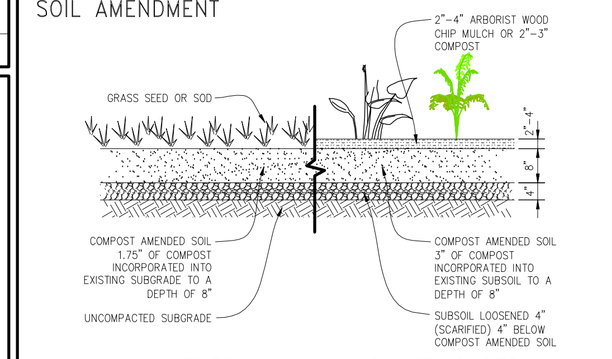
DETENTION CISTERN



NOTES:
1. OVERFLOW PIPE CAN BE INTERIOR OR EXTERIOR TO CISTERN.
2. MAXIMUM OF TWO CISTERNS CAN BE USED.
3. MINIMUM SIZE OF CISTERN SHALL BE 300 GALLONS.

SYMBOL: (DC)

SOIL AMENDMENT



NOTES:
1. POST CONSTRUCTION SOIL AMENDMENT IS REQUIRED ON ALL AREAS NOT COVERED BY IMPERVIOUS SURFACE WHERE SOIL IS DISTURBED DURING CONSTRUCTION.
2. SOIL AMENDMENT CALCULATIONS SHALL BE SHOWN ON THE POST-CONSTRUCTION SOIL AMENDMENT PLAN SHEET.
3. SOIL AMENDMENT MUST PASS A 12 INCH MINIMUM PROBE TEST.

SYMBOL: (SA)

SECTION VI: DRAINAGE CONTROL PLAN REQUIREMENTS

General requirements:

- Address and permit number of project.
- North arrow.
- Identification of the drawing's scale (min. 1" = 10').
- Property lines and dimensions.
- Identification of adjacent streets (by name), alleys or other adjacent public property.
- Curbs and sidewalks and street trees: type, location, dimensions.
- Street and alley improvement type (asphalt, concrete, gravel, etc.).
- Creeks, streams or any ECA areas, per CAM 103B, if they exist on the site.
- Location and dimensions of all driveways, parking areas, and other paved areas (existing and proposed).
- General location, size and shape of any structures presently on the site and of those proposed for construction; including buildings, retaining walls, patios, decks, porches, rockeries and driveways (existing and proposed).
- Specific location, size and shape of any structures presently on the site and those proposed for construction; including buildings, retaining walls, patios, decks, porches, rockeries and driveways (existing and proposed).
- Show specific location, size and species of all trees at least 6 inches in diameter measured 4 ½ feet above the ground.
- Areas not to be disturbed by construction must be indicated.
- Ground elevations and contour lines with labeled contour intervals on sloping sites or where earth grading is proposed.
- Identify top and bottom of slopes and show dimensions from slope top/bottom tot he building(s).
- Identify drainage ditches, natural watercourses, and culverts (near shorelines).
- Sewer mains (sanitary only {pss} and/or combined sewers {ps}).
- Storm drains {psd} and catch basins.
- Water mains, fire hydrants and water meters.
- Power poles, street lights, signal and transit poles, bus zones, street signs, etc. adjacent to the subject property.
- All other elements between the pavement edge and the property line (such as side sewer, electrical ducts and vaults, electrical conduits, mandholes, ditches culverts, etc.).
- On-site green stormwater infrastructure facilities. See below for further instructions.

Green stormwater infrastructure requirements:

- Identify contributing areas to each GSI facility.
- Bioretention Cells and Planters: Locations of top and bottom of cell, square footage of bottom area.
- Trees: Locations of newly planted and existing trees used for reduction credit.
- Permeable pavement: Location, type of pavement, slope, and total square footage.
- Impervious pavement: Location and total square footage.
- Green Roofs: Locations and square footage.
- Cisterns: Locations, contributing roof areas, discharge locations and use.

Standard Drainage features:

- Pump systems (wet wells), pump sizes, maintenance holes (MHs), cleanouts, downspouts, catch basins, and area drains.
- Footing drain connections to on-site basins.

DRAINAGE CONTROL PLAN

CHECK SCALE USED: ☐ ONE SQUARE = ONE FOOT (1"=5')
☐ ONE SQUARE = TWO FEET (1"=10')
☐ ONE SQUARE = FOUR FEET (1"=20')

NORTH ARROW

CITY OF SEATTLE DPD
DEPARTMENT OF PLANNING AND DEVELOPMENT

Project Number: _____

SHEET
DRAINAGE
STANDARD PLAN

Address: _____